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## SEQUENCE LISTING

A1  
<110> THE JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE  
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<120> GLUTAMATE TRANSPORTER ASSOCIATED PROTEINS AND METHODS OF USE THEREOF

<130> JHU1650-2

<140> US 09/695,795

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<210> 1

<211> 7240

<212> DNA

<213> Rattus

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Leu	Tyr	Ser	Asp	Leu	Arg	Asp	Gly	Arg	Asn	Leu	Leu	Arg	Leu	Leu	Glu	
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Gln Lys Val His Leu Glu Asn Met Gly Ser His Asp Ile Val Asp Gly	
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Phe Asn Leu Ala Glu Lys Glu Leu Gly Leu Thr Lys Leu Leu Asp Pro	
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gac tat gcc cag acc atc aaa Asp Tyr Ala Gln Thr Ile Lys 1640	caa cta gca gcc agc agt caa gat Gln Leu Ala Ala Ser Ser Gln Asp 1645	gcc agc agt caa gat Ser Ser Gln Asp 1650	4959
atg att gac cat gaa cat cca Met Ile Asp His Glu His Pro 1655	gag agc aca agg tta aca ata cgc Glu Ser Thr Arg Leu Thr Ile Arg 1660	gag tta aca ata cgc Leu Thr Ile Arg 1665	5004
caa gcc cag gtg gac aag ctg Gln Ala Gln Val Asp Lys Leu 1670	tac gcc ggc cta aag gag ctg gca Tyr Ala Gly Leu Lys Glu Leu Ala 1675	gag ctg gca Glu Leu Ala 1680	5049
gga gag cgg cgt gag cgt ctg Gly Glu Arg Arg Glu Arg Leu 1685	cag gag cac ctc agg ctg tgc cag Gln Glu His Leu Arg Leu Cys Gln 1690	agg ctg tgc cag Arg Leu Cys Gln 1695	5094
ctc cgc aga gag ctg gat gac Leu Arg Arg Glu Leu Asp Asp 1700	ctg gag cag tgg ata cag gag cga Leu Glu Gln Trp Ile Gln Glu Arg 1705	gag cag gag cga Gln Glu Arg 1710	5139
gaa gtc gtg gca gcc tcc cat Glu Val Val Ala Ala Ser His 1715	gaa ctg ggc cag gac tat gag cat Glu Leu Gly Gln Asp Tyr Glu His 1720	gac tat gag cat Asp Tyr Glu His 1725	5184
gtg act atg ctt cgg gac aaa Val Thr Met Leu Arg Asp Lys 1730	ttc cga gag ttc tcc agg gac acc Phe Arg Glu Phe Ser Arg Asp Thr 1735	gag ttc tcc agg gac acc Glu Phe Ser Arg Asp Thr 1740	5229
agc acc att ggc caa gag cgt Ser Thr Ile Gly Gln Glu Arg 1745	gta gac agt gcc aat gcc ctg gcc Val Asp Ser Ala Asn Ala Leu Ala 1750	gac aat gcc ctg gcc Ala Asn Ala Leu Ala 1755	5274

aat ggg ctc att gct ggg ggc	cat gct gca tgg gcc	acc gtg gcc	5319
Asn Gly Leu Ile Ala Gly Gly	His Ala Ala Trp Ala	Thr Val Ala	
1760	1765	1770	
gag tgg aag gac agt ctc aat	gag gcc tgg gct gac	ctg ctg gag	5364
Glu Trp Lys Asp Ser Leu Asn	Glu Ala Trp Ala Asp	Leu Leu Glu	
1775	1780	1785	
ctg ctg gac aca aga ggt cag	gtg ctg gct gct gct	tat gag ctg	5409
Leu Leu Asp Thr Arg Gly Gln	Val Leu Ala Ala Ala	Tyr Glu Leu	
1790	1795	1800	
cag cgc ttc ctg cat ggg gcc	cgc caa gcc ctg gca	cgg gtg cag	5454
Gln Arg Phe Leu His Gly Ala	Arg Gln Ala Leu Ala	Arg Val Gln	
1805	1810	1815	
cac aag cag cag cag ctt cca	gat ggg acg ggc cgc	gac ctc aat	5499
His Lys Gln Gln Gln Leu Pro	Asp Gly Thr Gly Arg	Asp Leu Asn	
1820	1825	1830	
gct gct gag gcc ctg cag cgc	cgg cac tgc gcc tat	gag cac gac	5544
Ala Ala Glu Ala Leu Gln Arg	Arg His Cys Ala Tyr	Glu His Asp	
1835	1840	1845	
atc caa gcc ctc agc act cag	gtc cag cag gtt cag	gac gat ggc	5589
Ile Gln Ala Leu Ser Thr Gln	Val Gln Gln Val Gln	Asp Asp Gly	
1850	1855	1860	
ctc agg cta caa aag gcc tat	gct gga gac aag gct	gag gaa att	5634
Leu Arg Leu Gln Lys Ala Tyr	Ala Gly Asp Lys Ala	Glu Glu Ile	
1865	1870	1875	
ggc cgt cac atg cag gca gtg	gct gag gcg tgg gcc	cag ctc cag	5679
Gly Arg His Met Gln Ala Val	Ala Glu Ala Trp Ala	Gln Leu Gln	
1880	1885	1890	
gga agt tct gct gcc cgt cgc	cag ctg tta ctg gat	acc aca gac	5724
Gly Ser Ser Ala Ala Arg Arg	Gln Leu Leu Leu Asp	Thr Thr Asp	
1895	1900	1905	
aaa ttc cga ttc ttc aag gct	gtc cgg gag ttg atg	ctg tgg atg	5769
Lys Phe Arg Phe Phe Lys Ala	Val Arg Glu Leu Met	Leu Trp Met	
1910	1915	1920	
gat ggg att aac ctg cag atg	gat gcc cag gag agg	ccc cgg gat	5814
Asp Gly Ile Asn Leu Gln Met	Asp Ala Gln Glu Arg	Pro Arg Asp	
1925	1930	1935	
gtg tcc tct gca gat tta gtc	atc aaa aac caa caa	ggc atc aaa	5859
Val Ser Ser Ala Asp Leu Val	Ile Lys Asn Gln Gln	Gly Ile Lys	
1940	1945	1950	
gca gag ata gag gca aga gct	gac agg ttc tcc gcc	tgc att gac	5904
Ala Glu Ile Glu Ala Arg Ala	Asp Arg Phe Ser Ala	Cys Ile Asp	
1955	1960	1965	
atg ggg caa gag ctg ctg gcc	cgg aac cac tat gcc	gct gag gag	5949
Met Gly Gln Glu Leu Leu Ala	Arg Asn His Tyr Ala	Ala Glu Glu	
1970	1975	1980	

atc tca gag aag ctg tct cag	cta cag tcc cgg cgc	cag gag aca	5994
Ile Ser Glu Lys Leu Ser Gln	Leu Gln Ser Arg Arg	Gln Glu Thr	
1985	1990	1995	
gct gaa aag tgg cag gag aag	atg gac tgg cta cag	ctt gtt ttg	6039
Ala Glu Lys Trp Gln Glu Lys	Met Asp Trp Leu Gln	Leu Val Leu	
2000	2005	2010	
gag gtg ctt gtg ttt ggg aga	gat gca ggc atg gca	gag gcc tgg	6084
Glu Val Leu Val Phe Gly Arg	Asp Ala Gly Met Ala	Glu Ala Trp	
2015	2020	2025	
cta tgc agt cag gag cca ttg	gtg cga agt gca gaa	ctg ggt tgc	6129
Leu Cys Ser Gln Glu Pro Leu	Val Arg Ser Ala Glu	Leu Gly Cys	
2030	2035	2040	
act gtg gat gaa gta gag agc	ctc atc aag cgg cat	gaa gcc ttc	6174
Thr Val Asp Glu Val Glu Ser	Leu Ile Lys Arg His	Glu Ala Phe	
2045	2050	2055	
cag aag tca gca gtg gcc tgg	gag gag cgt ttc agt	gcc ctg gag	6219
Gln Lys Ser Ala Val Ala Trp	Glu Glu Arg Phe Ser	Ala Leu Glu	
2060	2065	2070	
aag ctc act gcg ctg gaa gag	cgg gag aat gag cag	aaa agg aag	6264
Lys Leu Thr Ala Leu Glu Glu	Arg Glu Asn Glu Gln	Lys Arg Lys	
2075	2080	2085	
agg gag gag gag gaa cga agg	aaa cag ccc cct act	tca gag ccc	6309
Arg Glu Glu Glu Glu Arg Arg	Lys Gln Pro Pro Thr	Ser Glu Pro	
2090	2095	2100	
atg gct agt caa ccg gaa ggg	agt ctg gta gat ggc	cag aga gtt	6354
Met Ala Ser Gln Pro Glu Gly	Ser Leu Val Asp Gly	Gln Arg Val	
2105	2110	2115	
ctt gac act gcc tgg gat ggg	acc cag tca aaa ttg	cca cca tcc	6399
Leu Asp Thr Ala Trp Asp Gly	Thr Gln Ser Lys Leu	Pro Pro Ser	
2120	2125	2130	
aca caa gca ccc agc att aat	ggg gtc tgc acg gac	acg gag tcc	6444
Thr Gln Ala Pro Ser Ile Asn	Gly Val Cys Thr Asp	Thr Glu Ser	
2135	2140	2145	
tca cag cct ctg ttg gaa cag	caa aga ctt gaa cag	agc aat gtc	6489
Ser Gln Pro Leu Leu Glu Gln	Gln Arg Leu Glu Gln	Ser Asn Val	
2150	2155	2160	
cca gaa ggg cct gga tct ggc	aca gga gac gag tcc	agc ggg ccc	6534
Pro Glu Gly Pro Gly Ser Gly	Thr Gly Asp Glu Ser	Ser Gly Pro	
2165	2170	2175	
cgg gga gag agg cag acc ctg	ccc cgg ggc cct gct	ccg tct cca	6579
Arg Gly Glu Arg Gln Thr Leu	Pro Arg Gly Pro Ala	Pro Ser Pro	
2180	2185	2190	
atg ccc cag agc aga tcg tct	gag tca gct cat gtt	gcc acc ctg	6624
Met Pro Gln Ser Arg Ser Ser	Glu Ser Ala His Val	Ala Thr Leu	
2195	2200	2205	
ccc gca cga ggt gct gag ctc	tct gct cag gaa cag	atg gaa ggg	6669

Pro	Ala	Arg	Gly	Ala	Glu	Leu	Ser	Ala	Gln	Glu	Gln	Met	Glu	Gly		
2210						2215					2220					
acg	ctg	tgc	cgc	aaa	cag	gag	atg	gaa	gcc	ttc	aat	aag	aaa	gct	6714	
Thr	Leu	Cys	Arg	Lys	Gln	Glu	Met	Glu	Ala	Phe	Asn	Lys	Lys	Ala		
2225						2230					2235					
gcc	aac	agg	tcc	tgg	cag	aat	gtg	tac	tgt	gta	ctt	cgg	cgt	gga	6759	
Ala	Asn	Arg	Ser	Trp	Gln	Asn	Val	Tyr	Cys	Val	Leu	Arg	Arg	Gly		
2240						2245					2250					
agc	ctc	ggc	ttt	tac	aag	gat	gcc	agg	gca	gct	agt	gca	gga	gtg	6804	
Ser	Leu	Gly	Phe	Tyr	Lys	Asp	Ala	Arg	Ala	Ala	Ser	Ala	Gly	Val		
2255						2260					2265					
cca	tac	cat	gga	gaa	gtg	cct	gtc	agt	ctg	gcc	agg	gcc	cag	ggc	6849	
Pro	Tyr	His	Gly	Glu	Val	Pro	Val	Ser	Leu	Ala	Arg	Ala	Gln	Gly		
2270						2275					2280					
agt	gtg	gcc	ttt	gat	tat	cgg	aaa	cgc	aaa	cat	gtc	ttc	aag	ctg	6894	
Ser	Val	Ala	Phe	Asp	Tyr	Arg	Lys	Arg	Lys	His	Val	Phe	Lys	Leu		
2285						2290					2295					
ggc	ttg	cag	gat	ggg	aaa	gag	tat	cta	ttc	cag	gcc	aag	gat	gag	6939	
Gly	Leu	Gln	Asp	Gly	Lys	Glu	Tyr	Leu	Phe	Gln	Ala	Lys	Asp	Glu		
2300						2305					2310					
gca	gag	atg	agc	tca	tgg	ctg	aga	gtg	gtg	aat	gca	gcc	att	gcc	6984	
Ala	Glu	Met	Ser	Ser	Trp	Leu	Arg	Val	Val	Asn	Ala	Ala	Ile	Ala		
2315						2320					2325					
act	gcg	tcc	tcg	gcc	tct	gga	gag	cca	gaa	gag	cca	gtg	gtg	ccc	7029	
Thr	Ala	Ser	Ser	Ala	Ser	Gly	Glu	Pro	Glu	Glu	Pro	Val	Val	Pro		
2330						2335					2340					
agt	gcc	agc	cgg	ggt	ctg	acc	agg	gcc	atg	acc	atg	ccc	cca	gtg	7074	
Ser	Ala	Ser	Arg	Gly	Leu	Thr	Arg	Ala	Met	Thr	Met	Pro	Pro	Val		
2345						2350					2355					
tca	cag	cct	gag	ggc	tcc	atc	gtg	ctt	cgc	agc	aag	gat	ggc	aga	7119	
Ser	Gln	Pro	Glu	Gly	Ser	Ile	Val	Leu	Arg	Ser	Lys	Asp	Gly	Arg		
2360						2365					2370					
gaa	aga	gag	cga	gaa	aaa	cga	ttc	agc	ttc	ttt	aag	aag	aac	aag	7164	
Glu	Arg	Glu	Arg	Glu	Lys	Arg	Phe	Ser	Phe	Phe	Lys	Lys	Asn	Lys		
2375						2380					2385					
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gtcgacagag	accacc					7240										

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 <212> PRT  
 <213> Rattus

<400> 2

Met	Ser	Ser	Thr	Leu	Ser	Pro	Thr	Asp	Phe	Asp	Ser	Leu	Glu	Ile	Gln
1				5				10					15		

Gly Gln Tyr Ser Asp Ile Asn Asn Arg Trp Asp Leu Pro Asp Ser Asp  
 20 25 30

Trp Asp Asn Asp Ser Ser Ser Ala Arg Leu Phe Glu Arg Ser Arg Ile  
 35 40 45

Lys Ala Leu Ala Asp Glu Arg Glu Ala Val Gln Lys Lys Thr Phe Thr  
 50 55 60

Lys Trp Val Asn Ser His Leu Ala Arg Val Thr Cys Arg Val Gly Asp  
 65 70 75 80

Leu Tyr Ser Asp Leu Arg Asp Gly Arg Asn Leu Leu Arg Leu Leu Glu  
 85 90 95

Val Leu Ser Gly Glu Thr Leu Pro Lys Pro Thr Lys Gly Arg Met Arg  
 100 105 110

Ile His Cys Leu Glu Asn Val Asp Lys Ala Leu Gln Phe Leu Lys Glu  
 115 120 125

Gln Lys Val His Leu Glu Asn Met Gly Ser His Asp Ile Val Asp Gly  
 130 135 140

Asn His Arg Leu Thr Leu Gly Leu Val Trp Thr Ile Ile Leu Arg Phe  
 145 150 155 160

Gln Ile Gln Asp Ile Ser Val Glu Thr Glu Asp Asn Lys Glu Lys Lys  
 165 170 175

Ser Ala Lys Asp Ala Leu Leu Leu Trp Cys Gln Met Lys Thr Ala Gly  
 180 185 190

Tyr Pro Asn Val Asn Val His Asn Phe Thr Thr Ser Trp Arg Asp Gly  
 195 200 205

Leu Ala Phe Asn Ala Ile Val His Lys His Arg Pro Asp Leu Leu Asp  
 210 215 220

Phe Glu Ser Leu Lys Lys Cys Asn Ala His Tyr Asn Leu Gln Asn Ala  
 225 230 235 240

Phe Asn Leu Ala Glu Lys Glu Leu Gly Leu Thr Lys Leu Leu Asp Pro  
 245 250 255

Glu Asp Val Asn Val Asp Gln Pro Asp Glu Lys Ser Ile Ile Thr Tyr  
 260 265 270

Val Ala Thr Tyr Tyr His Tyr Phe Ser Lys Met Lys Ala Leu Ala Val  
 275 280 285

Glu Gly Lys Arg Ile Gly Lys Val Leu Asp His Ala Met Glu Ala Glu  
 290 295 300

His Leu Val Glu Lys Tyr Glu Ser Leu Ala Ser Glu Leu Leu Gln Trp  
 305 310 315 320

Ile Glu Gln Thr Ile Gly Thr Phe Asn Asp Arg Gln Leu Ala Asn Ser  
 325 330 335

Leu Ser Gly Val Gln Asn Gln Leu Gln Ser Phe Asn Ser Tyr Arg Thr  
 340 345 350

Val Glu Lys Pro Pro Lys Phe Thr Glu Lys Gly Asn Leu Glu Val Leu  
 355 360 365

Leu Phe Thr Ile Gln Ser Lys Leu Arg Ala Asn Asn Gln Lys Val Tyr  
 370 375 380

Thr Pro Arg Glu Gly Arg Leu Ile Ser Asp Ile Asn Lys Ala Trp Glu  
 385 390 395 400

Arg Leu Glu Lys Ala Glu His Glu Arg Glu Leu Ala Leu Arg Thr Glu  
 405 410 415

Leu Ile Arg Gln Glu Lys Leu Glu Gln Leu Ala Ala Arg Phe Asp Arg  
 420 425 430

Lys Ala Ala Met Arg Glu Thr Trp Leu Ser Glu Asn Gln Arg Leu Val  
 435 440 445

Ser Gln Asp Asn Phe Gly Leu Glu Leu Ala Ala Val Glu Ala Ala Val  
 450 455 460

Arg Lys His Glu Ala Ile Glu Thr Asp Ile Val Ala Tyr Ser Gly Arg  
 465 470 475 480

Val Gln Ala Val Asp Ala Val Ala Ala Glu Leu Ala Ala Glu His Tyr  
 485 490 495

His Asp Ile Lys Arg Ile Ala Ala Arg Gln Asn Asn Val Ala Arg Leu  
500 505 510

Trp Asp Phe Leu Arg Glu Met Val Ala Ala Arg Arg Glu Arg Leu Leu  
515 520 525

Leu Asn Leu Glu Leu Gln Lys Val Phe Gln Asp Leu Leu Tyr Leu Met  
530 535 540

Asp Trp Met Ala Glu Met Lys Gly Arg Leu Gln Ser Gln Asp Leu Gly  
545 550 555 560

Lys His Leu Ala Gly Val Glu Asp Leu Leu Gln Leu His Glu Leu Val  
565 570 575

Glu Ala Asp Ile Ala Val Gln Ala Glu Arg Val Arg Ala Val Ser Ala  
580 585 590

Ser Ala Leu Arg Phe Cys Asp Pro Gly Lys Glu Tyr Arg Pro Cys Gly  
595 600 605

Pro Gln Leu Val Ser Glu Arg Val Ala Thr Leu Glu Gln Ser Tyr Glu  
610 615 620

Ala Leu Cys Glu Leu Ala Ala Thr Arg Arg Ala Arg Leu Glu Glu Ser  
625 630 635 640

Arg Arg Leu Trp Arg Phe Leu Trp Glu Val Gly Glu Ala Glu Ala Trp  
645 650 655

Val Arg Glu Gln Gln His Leu Leu Ala Ser Ala Glu Thr Gly Arg Asp  
660 665 670

Leu Thr Gly Val Leu Arg Leu Leu Asn Lys His Thr Ala Leu Arg Gly  
675 680 685

Glu Met Ser Gly Arg Leu Gly Pro Leu Lys Leu Thr Leu Glu Gln Gly  
690 695 700

Gln Gln Leu Val Ala Glu Gly His Pro Gly Ala Asn Gln Ala Ser Thr  
705 710 715 720

Arg Ala Ala Glu Leu Gln Ala Gln Trp Glu Arg Leu Glu Ala Leu Ala  
725 730 735

Glu Glu Arg Ala Gln Arg Leu Ala Gln Ala Ala Ser Leu Tyr Gln Phe

740					745					750					
Gln	Ala	Asp	Ala	Asn	Asp	Met	Glu	Ala	Trp	Leu	Val	Asp	Ala	Leu	Arg
		755						760					765		
Leu	Val	Ser	Ser	Pro	Glu	Val	Gly	His	Asp	Glu	Phe	Ser	Thr	Gln	Ala
	770					775					780				
Leu	Ala	Arg	Gln	His	Arg	Ala	Leu	Glu	Glu	Glu	Ile	Arg	Ala	His	Arg
785					790					795					800
Pro	Thr	Leu	Asp	Ala	Leu	Arg	Glu	Gln	Ala	Ala	Ala	Leu	Pro	Pro	Ala
				805					810					815	
Leu	Ser	His	Thr	Pro	Glu	Val	Gln	Gly	Arg	Val	Pro	Thr	Leu	Glu	Gln
			820					825					830		
His	Tyr	Glu	Glu	Leu	Gln	Ala	Arg	Ala	Gly	Glu	Arg	Ala	Arg	Ala	Leu
		835					840					845			
Glu	Ala	Ala	Leu	Ala	Phe	Tyr	Thr	Met	Leu	Ser	Glu	Ala	Gly	Ala	Cys
	850					855					860				
Gly	Leu	Trp	Val	Glu	Glu	Lys	Glu	Gln	Trp	Leu	Asn	Gly	Leu	Ala	Leu
865					870					875					880
Pro	Glu	Arg	Leu	Glu	Asp	Pro	Glu	Val	Val	Gln	Gln	Arg	Phe	Glu	Thr
				885					890					895	
Leu	Glu	Pro	Glu	Met	Asn	Ala	Leu	Ala	Ala	Arg	Ile	Thr	Ala	Val	Ser
		900						905					910		
Asp	Ile	Ala	Glu	Gln	Leu	Leu	Lys	Ala	Ser	Pro	Pro	Gly	Lys	Asp	Arg
		915					920					925			
Ile	Ile	Gly	Thr	Gln	Glu	Gln	Leu	Asn	Gln	Arg	Trp	Gln	Gln	Phe	Arg
	930					935					940				
Ser	Leu	Ala	Gly	Gly	Lys	Lys	Ala	Ala	Leu	Thr	Ser	Ala	Leu	Ser	Ile
945					950					955					960
Gln	Asn	Tyr	His	Leu	Glu	Cys	Thr	Glu	Thr	Gln	Ala	Trp	Met	Arg	Glu
				965					970					975	
Lys	Thr	Lys	Val	Ile	Glu	Ser	Thr	Gln	Asp	Leu	Gly	Asn	Asp	Leu	Ala
			980					985					990		



Gly Val Leu Ala Leu Gln Arg Lys Leu Ala Gly Thr Glu Arg Asp Leu  
 995 1000 1005

Glu Ala Ile Ser Ala Arg Val Gly Glu Leu Thr Gln Glu Ala Asn  
 1010 1015 1020

Ala Leu Ala Ala Gly His Pro Ala Gln Ala Pro Ala Ile Asn Thr  
 1025 1030 1035

Arg Leu Gly Glu Val Gln Thr Gly Trp Glu Asp Leu Arg Ala Thr  
 1040 1045 1050

Met Arg Arg Arg Glu Glu Ser Leu Gly Glu Ala Arg Arg Leu Gln  
 1055 1060 1065

Asp Phe Leu Arg Ser Leu Asp Asp Phe Gln Ala Trp Leu Gly Arg  
 1070 1075 1080

Thr Gln Thr Ala Val Ala Ser Glu Glu Gly Pro Ala Thr Leu Pro  
 1085 1090 1095

Glu Ala Glu Ala Leu Leu Ala Gln His Ala Ala Leu Arg Gly Glu  
 1100 1105 1110

Val Glu Arg Ala Gln Ser Glu Tyr Ser Arg Leu Arg Thr Leu Gly  
 1115 1120 1125

Glu Glu Val Thr Arg Asp Gln Ala Asp Pro Gln Cys Leu Phe Leu  
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Arg Gln Arg Leu Glu Ala Leu Gly Thr Gly Trp Glu Glu Leu Gly  
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Arg Met Trp Glu Ser Arg Gln Gly Arg Leu Ala Gln Ala His Gly  
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Phe Gln Gly Phe Leu Arg Asp Ala Arg Gln Ala Glu Gly Val Leu  
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Ser Ser Gln Glu Tyr Val Leu Ser His Thr Glu Met Pro Gly Thr  
 1190 1195 1200

Leu Gln Ala Ala Asp Ala Ala Ile Lys Lys Leu Glu Asp Phe Met  
 1205 1210 1215

Ser Thr	Met Asp	Ala Asn	Gly	Glu Arg	Ile Arg	Gly	Leu Leu	Glu
1220			1225			1230		
Ala Gly	Arg Gln	Leu Val	Ser	Lys Gly	Asn Ile	His	Ala Glu	Lys
1235			1240			1245		
Ile Gln	Glu Lys	Ala Asp	Ser	Ile Glu	Lys Arg	His	Arg Lys	Asn
1250			1255			1260		
Gln Glu	Ala Val	Gln Gln	Leu	Leu Gly	Arg Leu	Arg	Asp Asn	Arg
1265			1270			1275		
Glu Gln	Gln His	Phe Leu	Gln	Asp Cys	Gln Glu	Leu	Lys Leu	Trp
1280			1285			1290		
Ile Asp	Glu Lys	Met Leu	Thr	Ala Gln	Asp Val	Ser	Tyr Asp	Glu
1295			1300			1305		
Ala Arg	Asn Leu	His Thr	Lys	Trp Gln	Lys His	Gln	Ala Phe	Met
1310			1315			1320		
Ala Glu	Leu Ala	Ala Asn	Lys	Asp Trp	Leu Asp	Lys	Val Asp	Lys
1325			1330			1335		
Glu Gly	Arg Glu	Leu Thr	Leu	Glu Lys	Pro Glu	Leu	Lys Val	Leu
1340			1345			1350		
Val Ser	Glu Lys	Leu Glu	Asp	Leu His	Arg Arg	Trp	Asp Glu	Leu
1355			1360			1365		
Glu Thr	Thr Thr	Gln Ala	Lys	Ala Arg	Ser Leu	Phe	Asp Ala	Asn
1370			1375			1380		
Arg Ala	Glu Leu	Phe Ala	Gln	Ser Cys	Ser Ala	Leu	Glu Ser	Trp
1385			1390			1395		
Leu Glu	Ser Leu	Gln Ala	Gln	Leu His	Ser Asp	Asp	Tyr Gly	Lys
1400			1405			1410		
Asp Leu	Thr Ser	Val Asn	Ile	Leu Leu	Lys Lys	Gln	Gln Met	Leu
1415			1420			1425		
Glu Arg	Glu Met	Ala Val	Arg	Glu Lys	Glu Val	Glu	Ala Ile	Gln
1430			1435			1440		

Ala Gln	Ala Lys	Ala Leu	Ala	Gln Glu Asp Gln Ser	Ala Gly Glu
1445			1450		1455
Val Glu	Arg Thr Ser Arg	Ala	Val Glu Glu Lys Phe	Arg Ala Leu	
1460		1465		1470	
Cys Gln	Pro Met Lys Asp Arg	Cys Arg Arg Leu Gln	Ala Ser Arg		
1475		1480	1485		
Glu Gln	His Gln Phe His Arg	Asp Val Glu Asp Glu	Ile Leu Trp		
1490		1495	1500		
Val Thr	Glu Arg Leu Pro Met	Ala Ser Ser Leu Glu	His Gly Lys		
1505		1510	1515		
Asp Leu	Pro Ser Val Gln Leu	Leu Met Lys Lys Asn	Gln Thr Leu		
1520		1525	1530		
Gln Lys	Glu Ile Gln Gly His	Glu Pro Arg Ile Ala	Asp Leu Lys		
1535		1540	1545		
Glu Arg	Gln Arg Thr Leu Arg	Thr Ala Ala Ala Gly	Pro Glu Leu		
1550		1555	1560		
Ala Glu	Leu Gln Glu Met Trp	Lys Arg Leu Ser His	Glu Leu Glu		
1565		1570	1575		
Leu Arg	Gly Lys Arg Leu Glu	Glu Ala Leu Arg Ala	Gln Gln Phe		
1580		1585	1590		
Tyr Arg	Asp Ala Ala Glu Ala	Glu Ala Trp Met Gly	Glu Gln Glu		
1595		1600	1605		
Leu His	Met Met Gly Gln Glu	Lys Ala Lys Asp Glu	Leu Ser Ala		
1610		1615	1620		
Gln Ala	Glu Val Lys Lys His	Gln Val Leu Glu Gln	Ala Leu Ala		
1625		1630	1635		
Asp Tyr	Ala Gln Thr Ile Lys	Gln Leu Ala Ala Ser	Ser Gln Asp		
1640		1645	1650		
Met Ile	Asp His Glu His Pro	Glu Ser Thr Arg Leu	Thr Ile Arg		
1655		1660	1665		
Gln Ala	Gln Val Asp Lys Leu	Tyr Ala Gly Leu Lys	Glu Leu Ala		

1670	1675	1680
Gly Glu Arg Arg Glu Arg Leu Gln Glu His Leu Arg Leu Cys Gln 1685 1690 1695		
Leu Arg Arg Glu Leu Asp Asp Leu Glu Gln Trp Ile Gln Glu Arg 1700 1705 1710		
Glu Val Val Ala Ala Ser His Glu Leu Gly Gln Asp Tyr Glu His 1715 1720 1725		
Val Thr Met Leu Arg Asp Lys Phe Arg Glu Phe Ser Arg Asp Thr 1730 1735 1740		
Ser Thr Ile Gly Gln Glu Arg Val Asp Ser Ala Asn Ala Leu Ala 1745 1750 1755		
Asn Gly Leu Ile Ala Gly Gly His Ala Ala Trp Ala Thr Val Ala 1760 1765 1770		
Glu Trp Lys Asp Ser Leu Asn Glu Ala Trp Ala Asp Leu Leu Glu 1775 1780 1785		
Leu Leu Asp Thr Arg Gly Gln Val Leu Ala Ala Ala Tyr Glu Leu 1790 1795 1800		
Gln Arg Phe Leu His Gly Ala Arg Gln Ala Leu Ala Arg Val Gln 1805 1810 1815		
His Lys Gln Gln Gln Leu Pro Asp Gly Thr Gly Arg Asp Leu Asn 1820 1825 1830		
Ala Ala Glu Ala Leu Gln Arg Arg His Cys Ala Tyr Glu His Asp 1835 1840 1845		
Ile Gln Ala Leu Ser Thr Gln Val Gln Gln Val Gln Asp Asp Gly 1850 1855 1860		
Leu Arg Leu Gln Lys Ala Tyr Ala Gly Asp Lys Ala Glu Glu Ile 1865 1870 1875		
Gly Arg His Met Gln Ala Val Ala Glu Ala Trp Ala Gln Leu Gln 1880 1885 1890		
Gly Ser Ser Ala Ala Arg Arg Gln Leu Leu Leu Asp Thr Thr Asp 1895 1900 1905		

Lys Phe	Arg Phe Phe Lys	Ala	Val Arg Glu Leu Met	Leu Trp Met
1910		1915		1920
Asp Gly	Ile Asn Leu Gln Met	Asp Ala Gln Glu Arg	Pro Arg Asp	
1925		1930	1935	
Val Ser	Ser Ala Asp Leu Val	Ile Lys Asn Gln Gln	Gly Ile Lys	
1940		1945	1950	
Ala Glu	Ile Glu Ala Arg Ala	Asp Arg Phe Ser Ala	Cys Ile Asp	
1955		1960	1965	
Met Gly	Gln Glu Leu Leu Ala	Arg Asn His Tyr Ala	Ala Glu Glu	
1970		1975	1980	
Ile Ser	Glu Lys Leu Ser Gln	Leu Gln Ser Arg Arg	Gln Glu Thr	
1985		1990	1995	
Ala Glu	Lys Trp Gln Glu Lys	Met Asp Trp Leu Gln	Leu Val Leu	
2000		2005	2010	
Glu Val	Leu Val Phe Gly Arg	Asp Ala Gly Met Ala	Glu Ala Trp	
2015		2020	2025	
Leu Cys	Ser Gln Glu Pro Leu	Val Arg Ser Ala Glu	Leu Gly Cys	
2030		2035	2040	
Thr Val	Asp Glu Val Glu Ser	Leu Ile Lys Arg His	Glu Ala Phe	
2045		2050	2055	
Gln Lys	Ser Ala Val Ala Trp	Glu Glu Arg Phe Ser	Ala Leu Glu	
2060		2065	2070	
Lys Leu	Thr Ala Leu Glu Glu	Arg Glu Asn Glu Gln	Lys Arg Lys	
2075		2080	2085	
Arg Glu	Glu Glu Glu Arg Arg	Lys Gln Pro Pro Thr	Ser Glu Pro	
2090		2095	2100	
Met Ala	Ser Gln Pro Glu Gly	Ser Leu Val Asp Gly	Gln Arg Val	
2105		2110	2115	
Leu Asp	Thr Ala Trp Asp Gly	Thr Gln Ser Lys Leu	Pro Pro Ser	
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Thr	Gln	Ala	Pro	Ser	Ile	Asn	Gly	Val	Cys	Thr	Asp	Thr	Glu	Ser
2135						2140					2145			
Ser	Gln	Pro	Leu	Leu	Glu	Gln	Gln	Arg	Leu	Glu	Gln	Ser	Asn	Val
2150						2155					2160			
Pro	Glu	Gly	Pro	Gly	Ser	Gly	Thr	Gly	Asp	Glu	Ser	Ser	Gly	Pro
2165						2170					2175			
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Met	Pro	Gln	Ser	Arg	Ser	Ser	Glu	Ser	Ala	His	Val	Ala	Thr	Leu
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Thr	Leu	Cys	Arg	Lys	Gln	Glu	Met	Glu	Ala	Phe	Asn	Lys	Lys	Ala
2225						2230					2235			
Ala	Asn	Arg	Ser	Trp	Gln	Asn	Val	Tyr	Cys	Val	Leu	Arg	Arg	Gly
2240						2245					2250			
Ser	Leu	Gly	Phe	Tyr	Lys	Asp	Ala	Arg	Ala	Ala	Ser	Ala	Gly	Val
2255						2260					2265			
Pro	Tyr	His	Gly	Glu	Val	Pro	Val	Ser	Leu	Ala	Arg	Ala	Gln	Gly
2270						2275					2280			
Ser	Val	Ala	Phe	Asp	Tyr	Arg	Lys	Arg	Lys	His	Val	Phe	Lys	Leu
2285						2290					2295			
Gly	Leu	Gln	Asp	Gly	Lys	Glu	Tyr	Leu	Phe	Gln	Ala	Lys	Asp	Glu
2300						2305					2310			
Ala	Glu	Met	Ser	Ser	Trp	Leu	Arg	Val	Val	Asn	Ala	Ala	Ile	Ala
2315						2320					2325			
Thr	Ala	Ser	Ser	Ala	Ser	Gly	Glu	Pro	Glu	Glu	Pro	Val	Val	Pro
2330						2335					2340			
Ser	Ala	Ser	Arg	Gly	Leu	Thr	Arg	Ala	Met	Thr	Met	Pro	Pro	Val
2345						2350					2355			

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 Gln Ser His Leu Ser Ser Pro Ile Ala Ser Trp Leu Ser Ser Leu Ser  
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 Ser Leu Gly Asp Ser Thr Pro Glu Arg Thr Ser Pro Ser His His Arg  
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 Gln Pro Ser Asp Thr Ser Glu Thr Thr Ala Gly Leu Val Gln Arg Cys  
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 85 90 95  
 aaa gct ggt gtg aaa gag ggt gac cgg atc atc aaa gta aac ggc acc 336  
 Lys Ala Gly Val Lys Glu Gly Asp Arg Ile Ile Lys Val Asn Gly Thr  
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 115 120 125  
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 Val Asn Pro Ile Ile Pro Pro Pro Pro Pro Pro Pro Pro Leu Pro Pro

165	170	175	
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Pro Gln His Ile Thr Gly Pro Lys	Pro Leu Gln Asp Pro	Glu Val Gln	
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Lys His Ala Thr Gln Ile Leu Trp Asn Met Leu Arg Gln Glu Glu Glu			
195	200	205	
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Glu Leu Gln Asp Ile Leu Pro Pro Cys Gly Glu Thr Ser Gln Arg Thr			
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Cys Glu Gly Arg Leu Ser Val Asp Ser Gln Glu Ala Asp Ser Gly Leu			
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Asp Ser Gly Thr Glu Arg Phe Pro Ser Ile Ser Glu Ser Leu Met Asn			
245	250	255	
cgg aac tca gta ttg tca gat cct gga cta gac agc cct caa acc tcc			816
Arg Asn Ser Val Leu Ser Asp Pro Gly Leu Asp Ser Pro Gln Thr Ser			
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cct gta atc ctg gcc agg gtg gcc cag cac cac agg cga cag gcc tca			864
Pro Val Ile Leu Ala Arg Val Ala Gln His His Arg Arg Gln Gly Ser			
275	280	285	
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Asp Ala Ala Leu Leu Pro Leu Asn His Gln Gly Ile Asp Gln Ser Pro			
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Lys Pro Leu Ile Ile Gly Pro Glu Glu Asp Tyr Asp Pro Gly Tyr Phe			
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Asn Asn Glu Ser Asp Ile Ile Phe Gln Asp Leu Glu Lys Leu Lys Ser			
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Asp Pro Gly Pro Leu Leu Phe Tyr Leu Cys Ser Glu Val Tyr Gln Gln			
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Thr Asn Pro Lys Asp Ser Arg Ser Leu Gly Lys Asp Ile Trp Asn Ile			
370	375	380	
ttc ctg gag aaa aat gcg cct ctc aga gtg aag atc cct gag atg ttg			1200
Phe Leu Glu Lys Asn Ala Pro Leu Arg Val Lys Ile Pro Glu Met Leu			
385	390	395	400
cag gct gaa att gac cta cgc ctg cgg aac aat gag gac cct cgc aat			1248
Gln Ala Glu Ile Asp Leu Arg Leu Arg Asn Asn Glu Asp Pro Arg Asn			
405	410	415	



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atc Ile	aac Asn	gac Asp 435	tac Tyr	aga Arg	tcc Ser	aag Lys	cgt Arg 440	act Thr	ctg Leu	ggc Gly	ctg Leu	ggc Gly	agc Ser	ctc Leu	tat Tyr	1344
ggc Gly	gaa Glu 450	aat Asn	gac Asp	ctg Leu	cta Leu	ggc Gly 455	ctg Leu	gat Asp	ggg Gly	gac Asp	cct Pro	ctt Leu	cga Arg	gaa Glu	cgc Arg	1392
caa Gln 465	atg Met	gct Ala	gag Glu	aag Lys	cag Gln	ctg Leu	gct Ala	gcc Ala	ctt Leu	gga Gly	gat Asp	atc Ile	ttg Leu	tcc Ser	aaa Lys 480	1440
tat Tyr	gag Glu	gaa Glu	gat Asp	cgg Arg	agt Ser	gcc Ala	ccc Pro	atg Met	gac Asp	ttt Phe	gct Ala	gtt Val	aat Asn	acc Thr	ttt Phe	1488
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gca Ala	gaa Glu	aag Lys 515	acc Thr	cag Gln	tct Ser	gcc Ala	cct Pro	gac Asp	aag Lys	gac Asp	aag Lys	tgg Trp	ctg Leu	ccc Pro	ttc Phe	1584
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gcc Ala 545	ttg Leu	gag Glu	gac Asp	aag Lys	aag Lys	cga Arg	aac Asn	ccc Pro	atc Ile	ctc Leu	aga Arg	tat Tyr	att Ile	ggg Gly	aag Lys 560	1680
ccc Pro	aag Lys	agc Ser	tcc Ser	tct Ser	cag Gln	agc Ser	att Ile	aag Lys	cca Pro	ggc Gly	aat Asn	gtg Val	agg Arg	aac Asn	atc Ile	1728
att Ile	cag Gln	cac His	ttt Phe 580	gag Glu	aac Asn	agc Ser	cat His	cag Gln	tat Tyr	gat Asp	gtc Val	cca Pro	gag Glu	ccg Pro	ggg Gly	1776
aca Thr	caa Gln	cga Arg	ctc Leu	tca Ser	aca Thr	gga Gly	agc Ser	ttt Phe	cct Pro	gag Glu	gac Asp	ctg Leu	ctg Leu	gag Glu	agt Ser	1824
gac Asp	agt Ser 610	tcg Ser	cgc Arg	tca Ser	gag Glu	att Ile	cga Arg	ctg Leu	ggc Gly	cgc Arg	tct Ser	ggg Gly	agc Ser	ctc Leu	aag Lys	1872
ggc Gly 625	cgg Arg	gaa Glu	gag Glu	atg Met	aag Lys	cga Arg	tcc Ser	cgg Arg	aaa Lys	gca Ala	gag Glu	aac Asn	gtg Val	ccc Pro	cgg Arg 640	1920
cct Pro	cga Arg	agt Ser	gac Asp	gtt Val	gac Asp	atg Met	gat Asp	gct Ala	gct Ala	gca Ala	gag Glu	gct Ala	gcc Ala	cgc Arg	ctt Leu	1968

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Asn Glu Ala Val Lys Gln Thr Glu Asn Arg His Arg Leu Glu Gly Tyr	
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 Val Ile Ile Gln Lys Asp Gln His Gly Phe Gly Phe Thr Val Ser Gly  
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 Lys Ala Gly Val Lys Glu Gly Asp Arg Ile Ile Lys Val Asn Gly Thr  
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 Met Val Thr Asn Ser Ser His Leu Glu Val Val Lys Leu Ile Lys Ser  
 115 120 125  
 Gly Ala Tyr Ala Ala Leu Thr Leu Leu Gly Ser Ser Pro Pro Ser Val  
 130 135 140  
 Gly Val Ser Gly Leu Gln Gln Asn Pro Ser Val Ala Gly Val Leu Arg  
 145 150 155 160  
 Val Asn Pro Ile Ile Pro Pro Pro Pro Pro Pro Pro Pro Leu Pro Pro  
 165 170 175  
 Pro Gln His Ile Thr Gly Pro Lys Pro Leu Gln Asp Pro Glu Val Gln  
 180 185 190  
 Lys His Ala Thr Gln Ile Leu Trp Asn Met Leu Arg Gln Glu Glu Glu  
 195 200 205  
 Glu Leu Gln Asp Ile Leu Pro Pro Cys Gly Glu Thr Ser Gln Arg Thr  
 210 215 220  
 Cys Glu Gly Arg Leu Ser Val Asp Ser Gln Glu Ala Asp Ser Gly Leu  
 225 230 235 240  
 Asp Ser Gly Thr Glu Arg Phe Pro Ser Ile Ser Glu Ser Leu Met Asn  
 245 250 255  
 Arg Asn Ser Val Leu Ser Asp Pro Gly Leu Asp Ser Pro Gln Thr Ser  
 260 265 270  
 Pro Val Ile Leu Ala Arg Val Ala Gln His His Arg Arg Gln Gly Ser

275	280	285
Asp Ala Ala Leu Leu Pro Leu Asn His Gln Gly Ile Asp Gln Ser Pro		
290	295	300
Lys Pro Leu Ile Ile Gly Pro Glu Glu Asp Tyr Asp Pro Gly Tyr Phe		
305	310	315
Asn Asn Glu Ser Asp Ile Ile Phe Gln Asp Leu Glu Lys Leu Lys Ser		
	325	330
His Pro Ala Tyr Leu Val Val Phe Leu Arg Tyr Ile Leu Ser Gln Ala		
	340	345
Asp Pro Gly Pro Leu Leu Phe Tyr Leu Cys Ser Glu Val Tyr Gln Gln		
	355	360
Thr Asn Pro Lys Asp Ser Arg Ser Leu Gly Lys Asp Ile Trp Asn Ile		
	370	375
Phe Leu Glu Lys Asn Ala Pro Leu Arg Val Lys Ile Pro Glu Met Leu		
385	390	395
Gln Ala Glu Ile Asp Leu Arg Leu Arg Asn Asn Glu Asp Pro Arg Asn		
	405	410
Val Leu Cys Glu Ala Gln Glu Ala Val Met Leu Glu Ile Gln Glu Gln		
	420	425
Ile Asn Asp Tyr Arg Ser Lys Arg Thr Leu Gly Leu Gly Ser Leu Tyr		
	435	440
Gly Glu Asn Asp Leu Leu Gly Leu Asp Gly Asp Pro Leu Arg Glu Arg		
	450	455
Gln Met Ala Glu Lys Gln Leu Ala Ala Leu Gly Asp Ile Leu Ser Lys		
465	470	475
Tyr Glu Glu Asp Arg Ser Ala Pro Met Asp Phe Ala Val Asn Thr Phe		
	485	490
Met Ser His Ala Gly Ile Arg Leu Arg Glu Ser Arg Ser Ser Cys Thr		
	500	505
Ala Glu Lys Thr Gln Ser Ala Pro Asp Lys Asp Lys Trp Leu Pro Phe		
	515	520
		525

Phe Pro Lys Thr Lys Lys Gln Ser Ser Asn Ser Lys Lys Glu Lys Asp  
 530 535 540

Ala Leu Glu Asp Lys Lys Arg Asn Pro Ile Leu Arg Tyr Ile Gly Lys  
 545 550 555 560

Pro Lys Ser Ser Ser Gln Ser Ile Lys Pro Gly Asn Val Arg Asn Ile  
 565 570 575

Ile Gln His Phe Glu Asn Ser His Gln Tyr Asp Val Pro Glu Pro Gly  
 580 585 590

Thr Gln Arg Leu Ser Thr Gly Ser Phe Pro Glu Asp Leu Leu Glu Ser  
 595 600 605

Asp Ser Ser Arg Ser Glu Ile Arg Leu Gly Arg Ser Gly Ser Leu Lys  
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Gly Arg Glu Glu Met Lys Arg Ser Arg Lys Ala Glu Asn Val Pro Arg  
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Pro Arg Ser Asp Val Asp Met Asp Ala Ala Ala Glu Ala Ala Arg Leu  
 645 650 655

His Gln Ser Ala Ser Ser Ser Ala Ser Ser Leu Ser Thr Arg Ser Leu  
 660 665 670

Glu Asn Pro Thr Pro Pro Phe Thr Pro Lys Met Gly Arg Arg Ser Ile  
 675 680 685

Glu Ser Pro Asn Leu Gly Phe Cys Thr Asp Val Ile Leu Pro His Leu  
 690 695 700

Leu Glu Asp Asp Leu Gly Gln Leu Ser Asp Leu Glu Pro Glu Pro Glu  
 705 710 715 720

Val Gln Asn Trp Gln His Thr Val Gly Lys Asp Val Val Ala Asn Leu  
 725 730 735

Thr Gln Arg Glu Ile Asp Arg Gln Glu Val Ile Asn Glu Leu Phe Val  
 740 745 750

Thr Glu Ala Ser His Leu Arg Thr Leu Arg Val Leu Asp Leu Ile Phe  
 755 760 765



Tyr Gln Arg Met Arg Lys Glu Asn Leu Met Pro Arg Glu Glu Leu Ala  
 770 775 780

Arg Leu Phe Pro Asn Leu Pro Glu Leu Ile Glu Ile His Asn Ser Trp  
 785 790 795 800

Cys Glu Ala Met Lys Lys Leu Arg Glu Glu Gly Pro Ile Ile Arg Asp  
 805 810 815

Ile Ser Asp Pro Met Leu Ala Arg Phe Asp Gly Pro Ala Arg Glu Glu  
 820 825 830

Leu Gln Gln Val Ala Ala Gln Phe Cys Ser Tyr Gln Ser Val Ala Leu  
 835 840 845

Glu Leu Ile Arg Thr Lys Gln Arg Lys Glu Ser Arg Phe Gln Leu Phe  
 850 855 860

Met Gln Glu Ala Glu Ser His Pro Gln Cys Arg Arg Leu Gln Leu Arg  
 865 870 875 880

Asp Leu Ile Val Ser Glu Met Gln Arg Leu Thr Lys Tyr Pro Leu Leu  
 885 890 895

Leu Glu Asn Ile Ile Lys His Thr Glu Gly Gly Thr Ser Glu His Glu  
 900 905 910

Lys Leu Cys Arg Ala Arg Asp Gln Cys Arg Glu Ile Leu Lys Phe Val  
 915 920 925

Asn Glu Ala Val Lys Gln Thr Glu Asn Arg His Arg Leu Glu Gly Tyr  
 930 935 940

Gln Lys Arg Leu Asp Ala Thr Ala Leu Glu Arg Ala Ser Asn Pro Leu  
 945 950 955 960

Ala Ala Glu Phe Lys Ser Leu Asp Leu Thr Thr Arg Lys Met Ile His  
 965 970 975

Glu Gly Pro Leu Thr Trp Arg Ile Ser Lys Asp Lys Thr Leu Asp Leu  
 980 985 990

Gln Val Leu Leu Leu Glu Asp Leu Val Val Leu Leu Gln Arg Gln Glu  
 995 1000 1005

Glu Arg	Leu Leu Leu Lys	Cys	His Ser Lys Thr	Ala	Val Gly Ser
1010		1015		1020	
Ser Asp	Ser Lys Gln Thr	Phe	Ser Pro Val Leu	Lys	Leu Asn Ala
1025		1030		1035	
Val Leu	Ile Arg Ser Val	Ala	Thr Asp Lys Arg	Ala	Phe Phe Ile
1040		1045		1050	
Ile Cys	Thr Ser Glu Leu	Gly	Pro Pro Gln Ile	Tyr	Glu Leu Val
1055		1060		1065	
Ala Leu	Thr Ser Ser Asp	Lys	Asn Ile Trp Met	Glu	Leu Leu Glu
1070		1075		1080	
Glu Ala	Val Gln Asn Ala	Thr	Lys His Pro Gly	Ala	Ala Pro Ile
1085		1090		1095	
Pro Ile	His Pro Ser Pro	Pro	Gly Ser Gln Glu	Pro	Ala Tyr Gln
1100		1105		1110	
Gly Ser	Thr Ser Ser Arg	Val	Glu Ile Asn Asp	Ser	Glu Val Tyr
1115		1120		1125	
His Thr	Glu Lys Glu Pro	Lys	Lys Leu Pro Glu	Gly	Pro Gly Pro
1130		1135		1140	
Glu Gln	Arg Val Gln Asp	Lys	Gln Leu Ile Ala	Gln	Gly Glu Pro
1145		1150		1155	
Val Gln	Glu Glu Asp Glu	Glu	Glu Leu Arg Thr	Leu	Pro Arg Ala
1160		1165		1170	
Pro Pro	Ser Leu Asp Gly	Glu	Asn Arg Gly Ile	Arg	Thr Arg Asp
1175		1180		1185	
Pro Val	Leu Leu Ala Leu	Thr	Gly Pro Leu Leu	Met	Glu Gly Leu
1190		1195		1200	
Ala Asp	Ala Ala Leu Glu	Asp	Val Glu Asn Leu	Arg	His Leu Ile
1205		1210		1215	
Leu Trp	Ser Leu Leu Pro	Gly	His Thr Val Lys	Thr	Gln Ala Ala
1220		1225		1230	
Gly Glu	Pro Glu Asp Asp	Leu	Thr Pro Thr Pro	Ser	Val Val Ser

1235		1240		1245
Ile Thr Ser His Pro Trp Asp	Pro Gly Ser Pro Gly	Gln Ala Pro		
1250	1255	1260		
Thr Ile Ser Asp Ser Thr Arg	Leu Ala Arg Pro Glu	Gly Ser Gln		
1265	1270	1275		
Pro Glu Gly Glu Asp Val Ala	Val Ser Ser Leu Ala	His Leu Pro		
1280	1285	1290		
Pro Arg Thr Arg Ser Ser Gly	Val Trp Asp Ser Pro	Glu Leu Asp		
1295	1300	1305		
Arg Asn Pro Ala Ala Glu Ala	Ala Ser Thr Glu Pro	Ala Ala Ser		
1310	1315	1320		
Tyr Lys Val Val Arg Lys Val	Ser Leu Leu Pro Gly	Gly Gly Val		
1325	1330	1335		
Gly Ala Ala Lys Val Ala Gly	Ser Asn Ala Ile Pro	Asp Ser Gly		
1340	1345	1350		
Gln Ser Glu Ser Glu Leu Ser	Glu Val Glu Gly Gly	Ala Gln Ala		
1355	1360	1365		
Thr Gly Asn Cys Phe Tyr Val	Ser Met Pro Ala Gly	Pro Leu Asp		
1370	1375	1380		
Ser Ser Thr Glu Pro Thr Gly	Thr Pro Pro Ser Pro	Ser Gln Cys		
1385	1390	1395		
His Ser Leu Pro Ala Trp Pro	Thr Glu Pro Gln Pro	Tyr Arg Gly		
1400	1405	1410		
Val Arg Gly Gly Gln Cys Ser	Ser Leu Val Arg Arg	Asp Val Asp		
1415	1420	1425		
Val Ile Phe His Thr Ile Glu	Gln Leu Thr Ile Lys	Leu His Arg		
1430	1435	1440		
Leu Lys Asp Met Glu Leu Ala	His Arg Glu Leu Leu	Lys Ser Leu		
1445	1450	1455		
Gly Gly Glu Ser Ser Gly Gly	Thr Thr Pro Val Gly	Ser Phe His		
1460	1465	1470		

Thr Glu Ala Ala Arg Trp Thr Asp Tyr Ser Leu Ser Pro Pro Ala  
1475 1480 1485

Lys Glu Ala Leu Ala Ser Asp Ser Gln Asn Gly Gln Glu Gln Gly  
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Thr Asp Thr Ala Val Ser Pro Gly Pro  
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ggc tct gat cgt ttc gca cgg ccg gac ttc agg gat ata tcc aaa tgg 96  
Gly Ser Asp Arg Phe Ala Arg Pro Asp Phe Arg Asp Ile Ser Lys Trp  
20 25 30  
aac aac cgt gta gtg agc aat ctg ctc tat tac cag acc aac tac ctg 144  
Asn Asn Arg Val Val Ser Asn Leu Leu Tyr Tyr Gln Thr Asn Tyr Leu  
35 40 45  
gtg gtg gct gcc atg atg att tca gtc gtt ggg ttt ctg agc ccc ttc 192  
Val Val Ala Ala Met Met Ile Ser Val Val Gly Phe Leu Ser Pro Phe  
50 55 60  
aac atg atc ctt gga gga atc att gtg gtg ctg gtg ttc acg ggg ttt 240  
Asn Met Ile Leu Gly Gly Ile Ile Val Val Leu Val Phe Thr Gly Phe  
65 70 75 80  
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Val Trp Ala Ala His Asn Lys Asp Ile Leu Arg Arg Met Lys Lys Gln  
85 90 95  
tac cca acg gcc ttt gtc atg gtg gtc atg cta gcc agc tac ttc ctc 336  
Tyr Pro Thr Ala Phe Val Met Val Val Met Leu Ala Ser Tyr Phe Leu  
100 105 110  
ata tcc atg ttt ggg ggt gtc atg gtc ttt gtg ttt ggc atc acg ttt 384  
Ile Ser Met Phe Gly Gly Val Met Val Phe Val Phe Gly Ile Thr Phe  
115 120 125

ccc tta ttg ttg atg ttc atc cat gca tcc ctg aga ctt cga aac ctc 432  
 Pro Leu Leu Leu Met Phe Ile His Ala Ser Leu Arg Leu Arg Asn Leu  
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aag aac aaa ctg gaa aat aaa atg gag gga ata ggc ttg aag aaa acg 480  
 Lys Asn Lys Leu Glu Asn Lys Met Glu Gly Ile Gly Leu Lys Lys Thr  
 145 150 155 160

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 Pro Met Gly Ile Ile Leu Asp Ala Leu Glu Gln Gln Glu Asp Ser Ile  
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Gly Ser Asp Arg Phe Ala Arg Pro Asp Phe Arg Asp Ile Ser Lys Trp  
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Asn Asn Arg Val Val Ser Asn Leu Leu Tyr Tyr Gln Thr Asn Tyr Leu  
 35 40 45

Val Val Ala Ala Met Met Ile Ser Val Val Gly Phe Leu Ser Pro Phe  
 50 55 60

Asn Met Ile Leu Gly Gly Ile Ile Val Val Leu Val Phe Thr Gly Phe  
 65 70 75 80

Val Trp Ala Ala His Asn Lys Asp Ile Leu Arg Arg Met Lys Lys Gln  
 85 90 95

Tyr Pro Thr Ala Phe Val Met Val Val Met Leu Ala Ser Tyr Phe Leu  
 100 105 110

Ile Ser Met Phe Gly Gly Val Met Val Phe Val Phe Gly Ile Thr Phe  
 115 120 125

Pro Leu Leu Leu Met Phe Ile His Ala Ser Leu Arg Leu Arg Asn Leu  
 130 135 140

Lys Asn Lys Leu Glu Asn Lys Met Glu Gly Ile Gly Leu Lys Lys Thr

Pro Met Gly Ile Ile Leu Asp Ala Leu Glu Gln Gln Glu Asp Ser Ile

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Asn Lys Phe Ala Asp Tyr Ile Ser Lys Ala Arg Glu  
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cag ata ggc cta gat gag agt ggt ggt ggt ggt ggc atg acc ctt gga 385  
Gln Ile Gly Leu Asp Glu Ser Gly Gly Gly Gly Gly Met Thr Leu Gly  
30 35 40 45

gaa gct ccc acc cgt gtt gcc cct ggg gaa ctt cgc tct att cgg ggc 433  
Glu Ala Pro Thr Arg Val Ala Pro Gly Glu Leu Arg Ser Ile Arg Gly  
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cca ctc agc tct gca cca ggtctacctg gggtttcccag tctgctctag 481  
Pro Leu Ser Ser Ala Pro  
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gggccatgta cacaaatgga tacgatgaag aaatatatta tattggggga aagagagtgt 541

tcttgactcc aaaggcctgg cctttccctc actctgcacc a gag att gtg cat gaa 597  
Glu Ile Val His Glu  
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gac atg aag atg gga tct gat ggg gag agt gac cag gct tca gcc aca	645
Asp Met Lys Met Gly Ser Asp Gly Glu Ser Asp Gln Ala Ser Ala Thr	
75 80 85	
tcc tca gat gag gtg cag tct cca gtg aga gtg cgc atg cgc aac cac	693
Ser Ser Asp Glu Val Gln Ser Pro Val Arg Val Arg Met Arg Asn His	
90 95 100	
ccc cca cgc aag atc tcc act gag gat atc aac aaa tgc ctg tca cta	741
Pro Pro Arg Lys Ile Ser Thr Glu Asp Ile Asn Lys Cys Leu Ser Leu	
105 110 115 120	
cca gct gac ata cgg ctg cct gag ggc tac ctt gag aag ctg acc ctc	789
Pro Ala Asp Ile Arg Leu Pro Glu Gly Tyr Leu Glu Lys Leu Thr Leu	
125 130 135	
aat agc ccc atc ggt gat aag cct ctt agc cgg cgc ctc cgg cca gtc	837
Asn Ser Pro Ile Gly Asp Lys Pro Leu Ser Arg Arg Leu Arg Pro Val	
140 145 150	
agc ttg tct gag att ggc ttt gga aaa ctg gag acc tac atc aaa cta	885
Ser Leu Ser Glu Ile Gly Phe Gly Lys Leu Glu Thr Tyr Ile Lys Leu	
155 160 165	
gac aag ctg ggt gag ggt acc tat gcc act gtc tac aaa ggc aaa agc	933
Asp Lys Leu Gly Glu Gly Thr Tyr Ala Thr Val Tyr Lys Gly Lys Ser	
170 175 180	
aag ctc aca gac aac ctt gta gca ctt aag gag atc aga ctg gaa cac	981
Lys Leu Thr Asp Asn Leu Val Ala Leu Lys Glu Ile Arg Leu Glu His	
185 190 195 200	
gaa gaa ggg gca ccc tgc act gct atc cgg gaa gta tcc ctg ctt aag	1029
Glu Glu Gly Ala Pro Cys Thr Ala Ile Arg Glu Val Ser Leu Leu Lys	
205 210 215	
gac ctc aag cat gcc aac atc gtc aca cta cat gac att atc cac aca	1077
Asp Leu Lys His Ala Asn Ile Val Thr Leu His Asp Ile Ile His Thr	
220 225 230	
gag aag tcc ctc acc ctt gtc ttt gaa tac ttg gac aag gac ctg aag	1125
Glu Lys Ser Leu Thr Leu Val Phe Glu Tyr Leu Asp Lys Asp Leu Lys	
235 240 245	
cag tac ctg gat gac tgt gga aat gtc atc aac atg cac aat gtg aaa	1173
Gln Tyr Leu Asp Asp Cys Gly Asn Val Ile Asn Met His Asn Val Lys	
250 255 260	
ctg ttc ctg ttc cag ttg ctc cgt ggc ctg gcc tac tgc cac agg cag	1221
Leu Phe Leu Phe Gln Leu Leu Arg Gly Leu Ala Tyr Cys His Arg Gln	
265 270 275 280	
aag gtg cta cac cga gac ctc aag ccc cag aac cta ctc atc aac gag	1269
Lys Val Leu His Arg Asp Leu Lys Pro Gln Asn Leu Leu Ile Asn Glu	
285 290 295	
agg gga gag ctc aaa ctg gca gac ttt ggc ctg gct tac gcc aag tca	1317
Arg Gly Glu Leu Lys Leu Ala Asp Phe Gly Leu Ala Tyr Ala Lys Ser	
300 305 310	
att cct act aaa aca tac tcc aac gaa gtg gtg aca ctg tgg tac cgg	1365

Ile Pro Thr Lys Thr Tyr Ser Asn Glu Val Val Thr Leu Trp Tyr Arg	
315 320 325	
ccc cct gac atc tta ctt ggg tcc aca gac tac tcc ggc caa att gac	1413
Pro Pro Asp Ile Leu Leu Gly Ser Thr Asp Tyr Ser Gly Gln Ile Asp	
330 335 340	
atg tgg ggt gtt ggc tgc atc ttt tat gag atg gcc aca ggc cgg ccc	1461
Met Trp Gly Val Gly Cys Ile Phe Tyr Glu Met Ala Thr Gly Arg Pro	
345 350 355 360	
ctc ttc cca ggc tcc aca gtg gaa gaa cag ctg cac ttc atc ttc cgc	1509
Leu Phe Pro Gly Ser Thr Val Glu Glu Gln Leu His Phe Ile Phe Arg	
365 370 375	
att ttg gga acc cca act gag gac aca tgg cca ggt atc ctg tcc aat	1557
Ile Leu Gly Thr Pro Thr Glu Asp Thr Trp Pro Gly Ile Leu Ser Asn	
380 385 390	
gaa gag ttt aga aca tac aac tac ccc aag tac cga gcc gag gcc ctt	1605
Glu Glu Phe Arg Thr Tyr Asn Tyr Pro Lys Tyr Arg Ala Glu Ala Leu	
395 400 405	
ctg agg cat gca ccc cga ctt gaa tgc gat gga gct gac ctc ctc acc	1653
Leu Arg His Ala Pro Arg Leu Glu Cys Asp Gly Ala Asp Leu Leu Thr	
410 415 420	
aag ctg ctg cag ttt gag ggt cgc aat cgg atc tct gct gag gat gcc	1701
Lys Leu Leu Gln Phe Glu Gly Arg Asn Arg Ile Ser Ala Glu Asp Ala	
425 430 435 440	
atg aaa cat cca ttc ttt ctc agc ttg ggg gag cgg atc cac aaa ctt	1749
Met Lys His Pro Phe Phe Leu Ser Leu Gly Glu Arg Ile His Lys Leu	
445 450 455	
cct gac act act tcc ata ttt gca cta aag gag gta cag cta caa aag	1797
Pro Asp Thr Thr Ser Ile Phe Ala Leu Lys Glu Val Gln Leu Gln Lys	
460 465 470	
gag gcc aac att cgg tcc act tct atg cct gac tca ggc agg cca gct	1845
Glu Ala Asn Ile Arg Ser Thr Ser Met Pro Asp Ser Gly Arg Pro Ala	
475 480 485	
ttc cgt gtg gtg gat acc gag ttc taagccaagt tttaagccac agacagacca	1899
Phe Arg Val Val Asp Thr Glu Phe	
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Gly Gly Arg Gly Ile Asp Lys Thr Asn Gly Val Pro Glu Gln Ile Gly  
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Leu Asp Glu Ser Gly Gly Gly Gly Gly Met Thr Leu Gly Glu Ala Pro  
 35 40 45

Thr Arg Val Ala Pro Gly Glu Leu Arg Ser Ile Arg Gly Pro Leu Ser  
 50 55 60

Ser Ala Pro Glu Ile Val His Glu Asp Met Lys Met Gly Ser Asp Gly  
 65 70 75 80

Glu Ser Asp Gln Ala Ser Ala Thr Ser Ser Asp Glu Val Gln Ser Pro  
 85 90 95

Val Arg Val Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu

100	105	110
Asp Ile Asn Lys Cys Leu Ser	Leu Pro Ala Asp Ile Arg Leu Pro Glu	
115	120	125
Gly Tyr Leu Glu Lys Leu Thr	Leu Asn Ser Pro Ile Gly Asp Lys Pro	
130	135	140
Leu Ser Arg Arg Leu Arg Pro Val Ser	Leu Ser Glu Ile Gly Phe Gly	
145	150	155
Lys Leu Glu Thr Tyr Ile Lys Leu Asp	Lys Leu Gly Glu Gly Thr Tyr	
165	170	175
Ala Thr Val Tyr Lys Gly Lys Ser	Lys Leu Thr Asp Asn Leu Val Ala	
180	185	190
Leu Lys Glu Ile Arg Leu Glu His Glu Glu Gly	Ala Pro Cys Thr Ala	
195	200	205
Ile Arg Glu Val Ser Leu Leu Lys Asp	Leu Lys His Ala Asn Ile Val	
210	215	220
Thr Leu His Asp Ile Ile His Thr Glu Lys	Ser Leu Thr Leu Val Phe	
225	230	235
Glu Tyr Leu Asp Lys Asp Leu Lys Gln Tyr	Leu Asp Asp Cys Gly Asn	
245	250	255
Val Ile Asn Met His Asn Val Lys Leu Phe	Leu Phe Gln Leu Leu Arg	
260	265	270
Gly Leu Ala Tyr Cys His Arg Gln Lys Val	Leu His Arg Asp Leu Lys	
275	280	285
Pro Gln Asn Leu Leu Ile Asn Glu Arg Gly	Glu Leu Lys Leu Ala Asp	
290	295	300
Phe Gly Leu Ala Tyr Ala Lys Ser Ile Pro	Thr Lys Thr Tyr Ser Asn	
305	310	315
Glu Val Val Thr Leu Trp Tyr Arg Pro	Pro Asp Ile Leu Leu Gly Ser	
325	330	335
Thr Asp Tyr Ser Gly Gln Ile Asp Met Trp	Gly Val Gly Cys Ile Phe	
340	345	350

Tyr Glu Met Ala Thr Gly Arg Pro Leu Phe Pro Gly Ser Thr Val Glu  
           355                          360                          365

Glu Gln Leu His Phe Ile Phe Arg Ile Leu Gly Thr Pro Thr Glu Asp  
           370                          375                          380

Thr Trp Pro Gly Ile Leu Ser Asn Glu Glu Phe Arg Thr Tyr Asn Tyr  
           385                          390                          395                          400

Pro Lys Tyr Arg Ala Glu Ala Leu Leu Arg His Ala Pro Arg Leu Glu  
                           405                          410                          415

Cys Asp Gly Ala Asp Leu Leu Thr Lys Leu Leu Gln Phe Glu Gly Arg  
                           420                          425                          430

Asn Arg Ile Ser Ala Glu Asp Ala Met Lys His Pro Phe Phe Leu Ser  
           435                          440                          445

Leu Gly Glu Arg Ile His Lys Leu Pro Asp Thr Thr Ser Ile Phe Ala  
           450                          455                          460

Leu Lys Glu Val Gln Leu Gln Lys Glu Ala Asn Ile Arg Ser Thr Ser  
           465                          470                          475                          480

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gagctgcaag aggctgagct gactctaccc agcctgggga aaccctataa gtcactcatg 180  
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Arg Thr Met Thr Asn Val Leu Gly Asp Ser Ile Gly Ala Ala Val Ile  
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Glu His Leu Ser Gln Arg Glu Leu Glu Leu Gln Glu Ala Glu Leu Thr  
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Leu Pro Ser Leu Gly Lys Pro Tyr Lys Ser Leu Met Ala Gln Ala Lys  
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Gly Ala Ser Arg Gly Arg Gly Gly Asn Glu Ser Val Met  
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Asp Ala Phe Gly Thr Gly Ile Val Glu Lys Leu Ser Lys Lys Glu Leu  
 20 25 30

Glu Gln Val Asp Val Ser Ser Glu Val Asn Ile Val Asn Pro Phe Ala  
 35 40 45

Leu Glu Pro Thr Ile Leu Asp Asn Glu Asp Ser Asp Thr Lys Lys Ser  
 50 55 60

Tyr Val Asn Gly Gly Phe Ser Val Asp Lys Ser Asp Thr Ile Ser Phe  
 65 70 75 80

Thr Gln Thr Ser Gln Phe  
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&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; synthetic peptides representing EEAT4 C-Terminal Ab epitopes

&lt;400&gt; 14

Glu Lys Gly Ala Ser Arg Gly Arg Gly Gly Asn Glu Ser Ala  
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&lt;210&gt; 15

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; synthetic peptides representing EEAT4 N-Terminal Ab epitopes

&lt;400&gt; 15

Lys Asn Ser Leu Phe Leu Arg Glu Ser Gly Ala Gly Gly Gly Cys Leu  
 1 5 10 15

&lt;210&gt; 16

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

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&lt;223&gt; synthetic peptides representing rat GTRAP4-41 Ab epitopes

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Lys Arg Gly Pro Ala Pro Ser Pro Met Pro Gln Ser Arg Ser Ser Glu  
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 Met Tyr Thr Asn Gly Tyr Asp Glu Glu Ile Tyr Tyr Ile Gly  
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 Gly Lys Arg Val Phe Leu Thr Pro Lys Ala Trp Pro Phe Pro His Ser  
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 Ala Pro Glu Ile Val His Glu Asp Met Lys Met Gly Ser Asp Gly Glu  
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 Ser Asp Gln Ala Ser Ala Thr Ser Ser Asp Glu Val Gln Ser Pro Val  
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 Arg Val Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu Asp  
 65 70 75  
 atc aac aaa tgc ctg tca cta cca gct gac ata cgg ctg cct gag ggc 768  
 Ile Asn Lys Cys Leu Ser Leu Pro Ala Asp Ile Arg Leu Pro Glu Gly  
 80 85 90  
 tac ctt gag aag ctg acc ctc aat agc ccc atc ggt gat aag cct ctt 816  
 Tyr Leu Glu Lys Leu Thr Leu Asn Ser Pro Ile Gly Asp Lys Pro Leu  
 95 100 105 110  
 agc cgg cgc ctc cgg cca gtc agc ttg tct gag att ggc ttt gga aaa 864  
 Ser Arg Arg Leu Arg Pro Val Ser Leu Ser Glu Ile Gly Phe Gly Lys  
 115 120 125  
 ctg gag acc tac atc aaa cta gac aag ctg ggt gag ggt acc tat gcc 912  
 Leu Glu Thr Tyr Ile Lys Leu Asp Lys Leu Gly Glu Gly Thr Tyr Ala  
 130 135 140

act gtc tac aaa ggc aaa agc aag ctc aca gac aac ctt gta gca ctt	960
Thr Val Tyr Lys Gly Lys Ser Lys Leu Thr Asp Asn Leu Val Ala Leu	
145 150 155	
aag gag atc aga ctg gaa cac gaa gaa ggg gca ccc tgc act gct atc	1008
Lys Glu Ile Arg Leu Glu His Glu Glu Gly Ala Pro Cys Thr Ala Ile	
160 165 170	
cgg gaa gta tcc ctg ctt aag gac ctc aag cat gcc aac atc gtc aca	1056
Arg Glu Val Ser Leu Leu Lys Asp Leu Lys His Ala Asn Ile Val Thr	
175 180 185 190	
cta cat gac att atc cac aca gag aag tcc ctc acc ctt gtc ttt gaa	1104
Leu His Asp Ile Ile His Thr Glu Lys Ser Leu Thr Leu Val Phe Glu	
195 200 205	
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Tyr Leu Asp Lys Asp Leu Lys Gln Tyr Leu Asp Asp Cys Gly Asn Val	
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Ile Asn Met His Asn Val Lys Leu Phe Leu Phe Gln Leu Leu Arg Gly	
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ctg gcc tac tgc cac agg cag aag gtg cta cac cga gac ctc aag ccc	1248
Leu Ala Tyr Cys His Arg Gln Lys Val Leu His Arg Asp Leu Lys Pro	
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Gln Asn Leu Leu Ile Asn Glu Arg Gly Glu Leu Lys Leu Ala Asp Phe	
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ggc ctg gct tac gcc aag tca att cct act aaa aca tac tcc aac gaa	1344
Gly Leu Ala Tyr Ala Lys Ser Ile Pro Thr Lys Thr Tyr Ser Asn Glu	
275 280 285	
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Asp Tyr Ser Gly Gln Ile Asp Met Trp Gly Val Gly Cys Ile Phe Tyr	
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Glu Met Ala Thr Gly Arg Pro Leu Phe Pro Gly Ser Thr Val Glu Glu	
320 325 330	
cag ctg cac ttc atc ttc cgc att ttg gga acc cca act gag gac aca	1536
Gln Leu His Phe Ile Phe Arg Ile Leu Gly Thr Pro Thr Glu Asp Thr	
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Trp Pro Gly Ile Leu Ser Asn Glu Glu Phe Arg Thr Tyr Asn Tyr Pro	
355 360 365	
aag tac cga gcc gag gcc ctt ctg agg cat gca ccc cga ctt gaa tgc	1632
Lys Tyr Arg Ala Glu Ala Leu Leu Arg His Ala Pro Arg Leu Glu Cys	
370 375 380	
gat gga gct gac ctc ctc acc aag ctg ctg cag ttt gag ggt cgc aat	1680



Asp Gly Ala Asp Leu Leu Thr Lys Leu Leu Gln Phe Glu Gly Arg Asn	
385 390 395	
cgg atc tct gct gag gat gcc atg aaa cat cca ttc ttt ctc agc ttg	1728
Arg Ile Ser Ala Glu Asp Ala Met Lys His Pro Phe Phe Leu Ser Leu	
400 405 410	
ggg gag cgg atc cac aaa ctt cct gac act act tcc ata ttt gca cta	1776
Gly Glu Arg Ile His Lys Leu Pro Asp Thr Thr Ser Ile Phe Ala Leu	
415 420 425 430	
aag gag gta cag cta caa aag gag gcc aac att cgg tcc act tct atg	1824
Lys Glu Val Gln Leu Gln Lys Glu Ala Asn Ile Arg Ser Thr Ser Met	
435 440 445	
cct gac tca ggc agg cca gct ttc cgt gtg gtg gat acc gag ttc	1869
Pro Asp Ser Gly Arg Pro Ala Phe Arg Val Val Asp Thr Glu Phe	
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Gln Ala Ser Ala Thr Ser Ser Asp Glu Val Gln Ser Pro Val Arg Val  
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Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu Asp Ile Asn  
 65 70 75 80

Lys Cys Leu Ser Leu Pro Ala Asp Ile Arg Leu Pro Glu Gly Tyr Leu  
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Glu Lys Leu Thr Leu Asn Ser Pro Ile Gly Asp Lys Pro Leu Ser Arg  
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Arg Leu Arg Pro Val Ser Leu Ser Glu Ile Gly Phe Gly Lys Leu Glu  
 115 120 125

Thr Tyr Ile Lys Leu Asp Lys Leu Gly Glu Gly Thr Tyr Ala Thr Val  
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Tyr Lys Gly Lys Ser Lys Leu Thr Asp Asn Leu Val Ala Leu Lys Glu  
 145 150 155 160

Ile Arg Leu Glu His Glu Glu Gly Ala Pro Cys Thr Ala Ile Arg Glu  
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Val Ser Leu Leu Lys Asp Leu Lys His Ala Asn Ile Val Thr Leu His  
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Asp Ile Ile His Thr Glu Lys Ser Leu Thr Leu Val Phe Glu Tyr Leu  
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Asp Lys Asp Leu Lys Gln Tyr Leu Asp Asp Cys Gly Asn Val Ile Asn

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 Ser Gly Gln Ile Asp Met Trp Gly Val Gly Cys Ile Phe Tyr Glu Met  
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 Ala Thr Gly Arg Pro Leu Phe Pro Gly Ser Thr Val Glu Glu Gln Leu  
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 His Phe Ile Phe Arg Ile Leu Gly Thr Pro Thr Glu Asp Thr Trp Pro  
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 Gly Ile Leu Ser Asn Glu Glu Phe Arg Thr Tyr Asn Tyr Pro Lys Tyr  
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 Arg Ala Glu Ala Leu Leu Arg His Ala Pro Arg Leu Glu Cys Asp Gly  
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 Ser Ala Glu Asp Ala Met Lys His Pro Phe Phe Leu Ser Leu Gly Glu  
 405 410 415  
 Arg Ile His Lys Leu Pro Asp Thr Thr Ser Ile Phe Ala Leu Lys Glu  
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A'  
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